

REMARKS

In Paper No. 7 mailed September 27, 2002, the Examiner requested restriction between the claims of Group I (claims 1-16) and the claims of Group II (claims 17-54). The Applicant selected to prosecute the claims of Group I and traversed the restriction requirement. In the present Office Action, the Examiner has repeated the restriction requirement and made it Final. Accordingly, Applicant's cancel claims 17-54 drawn to the non-elected invention.

The Examiner rejected Claims 62 and 65 under 35 U.S.C. 112, second paragraph as indefinite. Claim 62 has been cancelled rendering the rejection of that claim moot. In claim 65, the Examiner identified the expression "box-type" as indefinite. Claim 65 has been amended to remove that expression and the claim is now believed to satisfy the requirements of 35 U.S.C. 112. It is believed that with the present amendment, all claims now conform to the requirements of 35 U.S.C. 112.

Applicant's invention, as embodied in Claim 1, is drawn to a copper alloy having specified additions of chromium, silver, titanium and silicon and optional additions of iron and tin. The claimed alloy has a yield strength on the order of 80 ksi (Applicant's specification at page 2, line 23) and an electrical conductivity that is at least 75% IACS (Applicant's specification at page 5, line 15). As detailed below, none of the references of record in the present application teach or suggest a copper alloy have the claimed composition nor a copper alloy having the recited combination of yield strength and electrical conductivity.

Claims 1-8, 11-16 and 55-68 were rejected under 35 U.S.C. 103 is unpatentable over JP59-193233. The reference discloses a copper – (0.01-2.0) weight percent

chromium alloy that may optionally also include zirconium. In addition, the reference discloses optional additions of one or more of 27 different “Group 1” and “Group 2” elements. The number of optional inclusions is even greater if individual rare earth elements are considered.

There is nothing in the Japanese reference to lead one skilled in the art to select a combination of silver, titanium and silicon as additions to a copper-chromium alloy. Rather, all 27 additions disclosed in the Japanese reference are presented as equally suitable. The odds of one skilled in the art randomly selecting additions of silver, titanium and silicon based on this Japanese reference is $1/27 \times 1/26 \times 1/25 = 1$ chance in 17,550. Further, Table 2 of the reference teaches away from additions of silver or titanium when a combination of high strength and high electrical conductivity is desired. While strength and conductivity values are not given, the reference uses circles that are presumed to mean acceptable, triangles that are presumed to mean marginal, and x’s that are presumed to mean not acceptable. Reference Example 8 shows that the addition of silver leads to a marginal strength copper alloy. Reference Example 13 shows that an addition of titanium leads to a marginal electrical conductivity alloy. Thus one skilled in the art seeking an alloy with 75% IACS conductivity and 80 ksi yield strength as claimed by the applicants would be dissuaded from adding titanium and/or silver to the alloy.

As noted in Applicant’s specification, it is the combined additions of specific amounts of silver, titanium silicon, and optionally iron and tin, to the alloy that enables achievement of both high strength and high conductivity.

It is not possible from JP59-193,233 to determine actual strength and conductivity values. However, the ASM Handbook, Volume 2, gives strength and conductivity values for a copper-chromium-zirconium (C18100) alloy and for copper-chromium alloys

(C18200, C18400, C18500). A copy of the pages of the ASM Handbook containing the data is appended. Not one of the copper chromium alloys that are essentially zirconium free as in Applicant's claim 1 are capable of a yield strength in excess of 67 ksi, much less than the minimum 80 ksi claimed by the applicants.

There is nothing in JP59-193,233 to teach or suggest a copper-chromium alloy that has a yield strength on the order of 80 ksi and electrical conductivity of at least 75% IACS as claimed by the applicants. Further, one skilled in the art seeking such an alloy would be dissuaded from additions of titanium and silver based on the teachings away of Table 2 of the Japanese reference. Applicant's claims, as amended, should be allowed over the cited reference.

Claims 1-8 and 11-16 were rejected under 35 U.S.C. 103 as unpatentable over JP2000063968. The Japanese reference is drawn to a copper-silver-iron-phosphorus alloy that may optionally contain titanium and chromium. The chromium range is 0.001% up to 0.1%. While the abstract to the Japanese reference does make reference to an addition of 1% of zinc, all other elements, including chromium, are present as additives at a maximum of 0.1%. Therefore, there is no overlap with applicant's claimed alloy. The reference (Japanese Patent Office computer translation at [0008]) discloses that the chromium should not exceed 0.1% otherwise the conductivity is reduced. Therefore, one skilled in the art seeking a high conductivity copper alloy as claimed by the applicants would be dissuaded from the teachings of this Japanese reference.

Further, as illustrated in Table 2 of JP2000063968, the yield strengths (believed to be the second column of "N/mm²" values run from 300 N/mm² to 350 N/mm² that is equivalent to 43.5 MPa to 50.8 MPa. Accordingly, there is nothing in this reference to

teach or suggest a high strength, high conductivity alloy as claimed by applicants.

Applicant's claims should be allowed over the cited Japanese reference.

Supplemental Information Disclosure Statement

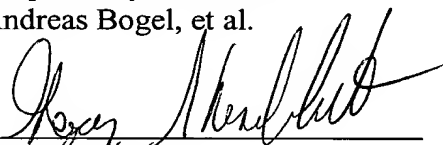
A Supplemental Information Disclosure Statement enclosing the search results of the Japanese Patent Office is enclosed.

It is respectfully submitted that the proposed amendments do not necessitate additional search by the Examiner and that they should be properly entered under the provisions of 37 C.F.R. 1.116. Applicants believe that with this amendment all claims are now in condition for allowance, or in the alternative in better condition for appeal. If the Examiner considers that an additional amendment is required to place the application in condition for allowance, he is invited to contact Applicant's attorney at the telephone number listed below.

Please apply any credits or charge any deficiencies to our Deposit Account No. 23-1665.

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